R22 Regulation *Subject code: 4E3BB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech III Semester Regular/Supplementary Examinations, December 2025

POWER SYSTEM-I

(EEE)

Maximum Marks: 60 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	State different non-conventional energy sources.	1	1	1
b)	What are the disadvantages of a gas turbine power plant?	1	1	1
c)	Define connected load.	1	2	1
d)	State the significance of a diversity factor.	1	2	1
e)	State skin effect.	1	3	1
f)	What are bundled conductors?	1	3	1
g)	What is the function of an isolator in a substation?	1	4	1
h)	What is the difference between indoor and outdoor substations?	1	4	1
i)	What is the need for a distribution system?	1	5	1
j)	Where do you use an underground distribution system?	1	5	1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2 a	Explain with a neat sketch the various parts of a nuclear reactor.	6	1	3
b	How do you select the site required to set up a hydro power station?	4	1	2
	OR			
3 a	Draw the schematic diagram of a modern steam power plant and explain its operation.	6	1	3
b	Explain the concept of the generation of ocean energy.	4	1	3
4 a	What is a tariff? State different desirable characteristics of a Tariff.	6	2	3
b	What is a load curve? Explain its significance.	4	2	3
	OR			
5	A generating station has the following daily load cycle: Time (hours) 0—6 6—10 10—12 12—16 16—20 20—24 Load (MW) 20 25 30 25 35 20 Draw the load curve and find (*i*) maximum demand, (*ii*) units generated per day, (*iii*) average load, (*iv*) load factor.	10	2	4

6 a	Derive an expression for the capacitance of a single-phase overhead transmission line.	6	3	3
b	Deduce an approximate expression for sag in overhead lines when Supports are at equal levels.	4	2	3
	OR			
7	A string of 4 insulator units has a self-capacitance equal to 9 times the pin-to-earth capacitance. Find (i) the voltage distribution across various units as a percentage of total voltage across the string (ii) the string efficiency.	10	3	3
8	Draw the single-line diagram of an air-insulated substation. Explain the function of each component.	10	4	3
	OR			
9 a	Explain the advantages of a GIS.	4	4	3
b	Explain different types of busbar arrangements in a substation.	6	4	3
10 a	State and explain the advantages of the ring main distributor.	5	5	3
b	How does a.c distribution differ from d.c. distribution?	5	5	3
	OR			
11	A 2-wire d.c distributor ABCDEA in the form of a ring main is fed at a point A at 220 V and is loaded as follows: 10 A at B; 20A at C; 30A at D, and 10A at E. The resistance of various sections (go and return) is AB=0.1Ω; BC=0.05Ω; CD=0.01Ω; DE=0.025Ω, and EA=0.075Ω. Find: (i) the point of minimum potential and (ii) the current in each section of the distributor.	10	5	4